Improve Copper Yield in Flotation Tanks

Benefits

- Increase product yield
- Reduce reagent consumption
- Reduced labor requirements

Background

Rich copper concentrate is produced from crude copper sulfide ore by means of a flotation process that takes advantage of the physical and chemical properties of small copper ore particles. To maximize the yield of copper, pH control is necessary in the flotation tanks.

Process

Crushed ore (containing 1 to 2 % copper), along with water and a lime slurry, is fed into a ball mill. This rotating drum contains steel balls that further crush the ore to a fine powder. When the ore / lime slurry emerges from the mill, it is fed to a rake classifier. Particles that are too large to pass from the classifier are returned to the mill, while the overflow is discharged to flotation cells.

Air is injected into the flotation cells, and foaming agents are added, creating a froth. Copper ore particles, due to their relatively light weight, become a part of this froth, while heavier particles, such as iron ore, do not. The copper-rich concentrate, containing 20 to 40 % copper, is then separated from the solution for further processing (Figure 1).

pH Control

The condition of the froth is directly dependent on pH. The flow rate of lime slurry is therefore regulated to keep the pH within the acceptable range. If pH is too low, iron will be entrapped as well as copper, decreasing the value of the copper ultimately recovered. If too much lime is added, the result is a dilute froth that requires additional concentration in later stages, increasing operating costs and wasting lime.

Instrumentation

The 396P TUpH™ Insertion/Submersion pH/ORP sensor is especially recommended for pH control in the high solids environment that is characteristic of lime slurries. Also, the reference junction is rugged and highly resistant to coating, resulting in reduced maintenance and process downtime.

The 396P is available both with and without a preamplifier and is compatible with all Rosemount Analytical analyzers and transmitters, including the 5081 pH/ORP Smart Two-Wire Transmitter, and the multi-parameter 1056 and 56 dual input analyzers.

396P pH/ORP TUpH Sensor

- Polypropylene reference junction for longer sensor life in process solutions containing heavy solids.
- Disposable, one-piece construction is convenient and economical where minimal troubleshooting and maintenance downtime are of prime importance.
- Versatile. Can be used in numerous loop configurations with all Rosemount Analytical and other manufacturers' instruments.

ROSEMOUNT® Analytical

EMERSON™ Process Management

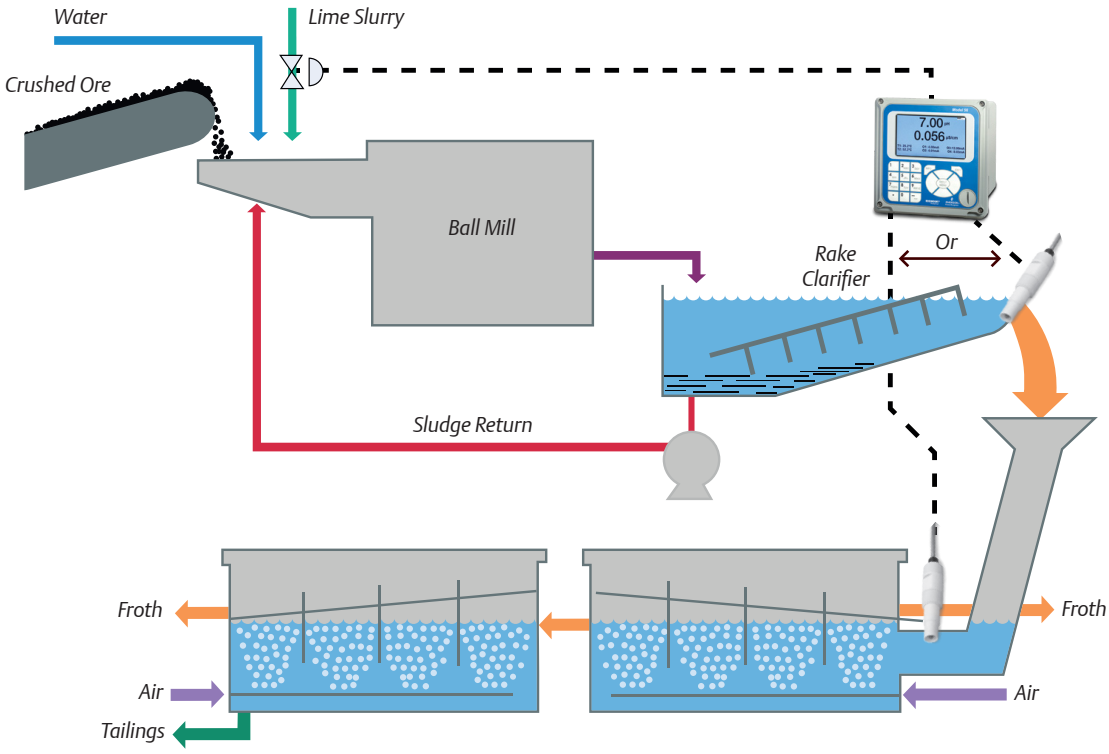
5081 pH/ORP Smart Two-Wire Transmitter

- Hand-held infrared remote control link to activate all the transmitter functions.
- NEMA 4X (IP65) weatherproof, corrosion-resistant enclosure.
- Non-volatile EEPROM memory to hold data in event of power failure.

56 pH/ORP Advanced Dual Input Analyzer

- Large color display of process trends.
- Data and event logging accessed via 2.0 USB port.
- Four configurable 4–20 alarm relays.
- PID control outputs and Time Proportional Control relays.

Figure 1 - Copper Flotation



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